

WHAT IS CLAIMED IS:

1. A user authentication device to which a user information processor and an authentication information processor are connected over a communication network,

wherein said user information processor comprises:

5 a function unit for sending a first authentication number to said authentication information processor; and

a function unit for converting the first authentication number to a second authentication number using a predetermined conversion rule in response to an access permission notification
10 from said authentication information processor and for using the second authentication number as a new first authentication number,
and

wherein said authentication information processor comprises:

15 a function unit for making a check using a database in response to the first authentication number from said user information processor;

a function unit for sending the access permission notification to said user information processor if a user is
20 authenticated as valid as a result of the check; and

a function unit for converting the first authentication number to a second authentication number using the same conversion rule after sending the access permission notification and for recording the second authentication number into the database as
25 a new first authentication number.

2. The user authentication device as defined by claim 1,
wherein said user information processor comprises:
a portable recording medium;
a function unit for reading a first authentication number
5 and a predetermined conversion rule from said portable recording
medium and for sending the first authentication number to said
authentication information processor; and
a function unit for converting the first authentication
number to a second authentication number using the conversion rule
10 in response to the access permission notification and for
recording the second authentication number on said portable
recording medium as a new first authentication number.
3. The user authentication device as defined by claim 1,
wherein said user information processor comprises:
a portable recording medium; and
a function unit for reading a first authentication number
5 from said portable recording medium and for sending the first
authentication number to said authentication information
processor, and
wherein said portable recording medium comprises a
function unit for converting the first authentication number to
10 a second authentication number using a predetermined conversion
rule in response to the access permission notification and for
recording the second authentication number on said portable
recording medium as a new first authentication number.
4. The user authentication device as defined by claim 1,

- wherein said user information processor comprises:
- a portable recording medium;
- a function unit for receiving a first authentication number and sending the first authentication number to said authentication information processor; and
- 5 a function unit for reading a predetermined conversion rule from said portable recording medium, for converting the first authentication number to a second authentication number using the conversion rule in response to the access permission notification, and for outputting the second authentication number as a new first authentication number.
- 10 5. A user authentication device to which a user information processor, a mediator information processor, and an authentication information processor are connected over a communication network,
- 5 wherein said user information processor comprises:
- a function unit for sending a first authentication number to said mediator information processor; and
- a function unit for converting a second authentication number to a third authentication number using a predetermined conversion rule in response to the second authentication number from said mediator information processor and for using the third authentication number as a new first authentication number,
- 15 wherein said mediator information processor comprises:
- a function unit for sending the first authentication number to said authentication information processor, said first

authentication number being received from said user information processor; and

a function unit for receiving the second authentication number from said authentication information processor and for
20 sending the second authentication number to said user information processor, and

wherein said authentication information processor comprises:

a function unit for making a check using a database in
25 response to the first authentication number from said mediator information processor and for sending the second authentication number to said mediator information processor if a user is authenticated as valid as a result of the check, the second authentication number being different from the first
30 authentication number; and

a function unit for converting the second authentication number to a third authentication number using the same conversion rule and for recording the third authentication number into the database as a new first authentication number.

6. The user authentication device as defined by claim 5,

wherein said user information processor comprises:

a portable recording medium;

a function unit for reading a first authentication number

5 and a predetermined conversion rule from said portable recording medium and for sending the first authentication number to said mediator information processor; and

a function unit for converting the second authentication number to a third authentication number using the conversion rule
10 in response to the second authentication number and for recording the second authentication number on said portable recording medium as a new first authentication number.

7. The user authentication device as defined by claim 5,

wherein said user information processor comprises:

a portable recording medium; and

a function unit for reading a first authentication number

5 from said portable recording medium and for sending the first authentication number to said mediator information processor, and

wherein said portable recording medium comprises a function unit for converting the second authentication number to a third authentication number using a predetermined conversion

10 rule in response to the second authentication number and for recording the third authentication number on said portable recording medium as a new first authentication number.

8. The user authentication device as defined by claim 5,

wherein said user information processor comprises:

a portable recording medium;

a function unit for receiving a first authentication

5 number and sending the first authentication number to said mediator information processor; and

a function unit for reading a predetermined conversion rule from said portable recording medium, for converting the second authentication number to a third authentication number

10 using the conversion rule in response to the second authentication number, and for outputting the third authentication number as a new first authentication number.

9. A transaction system using the user authentication device as defined by claim 2,

wherein said user information processor sends the first authentication number and an accounts-settlement request to said
5 authentication information processor,

wherein said authentication information processor executes the check and account-settlement processing, and

wherein said communication network is the Internet,

said user information processor is a terminal in a retail
10 store,

said authentication information processor is a credit card company terminal,

said portable recording medium is a credit card, and

said authentication number is a credit card number.

10. A transaction system using the user authentication device as defined by claim 3,

wherein said user information processor sends the first authentication number and an accounts-settlement request to said
5 authentication information processor,

wherein said authentication information processor executes the check and account-settlement processing, and

wherein said communication network is the Internet,

said user information processor is a terminal in a retail

10 store,

 said authentication information processor is a credit
card company terminal,

 said portable recording medium is a credit card, and

 said authentication number is a credit card number.

11. A transaction system using the user authentication device
as defined by claim 4,

 wherein said user information processor sends the first
authentication number and an accounts-settlement request to said
5 authentication information processor,

 wherein said authentication information processor
executes the check and account-settlement processing, and

 wherein said communication network is the Internet,

 said user information processor is a terminal in a retail
10 store,

 said authentication information processor is a banking
terminal,

 said portable recording medium is a cash card, and

 said authentication number is a personal identification
15 number.

12. A transaction system using the user authentication device
as defined by claim 6,

 wherein said mediator information processor sends the
first authentication number and an accounts-settlement request to

5 said authentication information processor,

 wherein said authentication information processor

executes the check and account-settlement processing, and
wherein said communication network is the Internet,
said user information processor is a user terminal,
10 said mediator information processor is a sales center
terminal,

said authentication information processor is a credit
card company terminal,

15 said portable recording medium is a credit card, and
said authentication number is a credit card number.

13. A transaction system using the user authentication device
as defined by claim 7,

wherein said mediator information processor sends the
first authentication number and an accounts-settlement request to
5 said authentication information processor,

wherein said authentication information processor
executes the check and account-settlement processing, and

wherein said communication network is the Internet,

said user information processor is a user terminal,

10 said mediator information processor is a sales center
terminal,

said authentication information processor is a credit
card company terminal,

said portable recording medium is a credit card, and
15 said authentication number is a credit card number.

14. A transaction system using the user authentication device
as defined by claim 8,

wherein said mediator information processor sends the first authentication number and an accounts-settlement request to
5 said authentication information processor,

wherein said authentication information processor executes the check and account-settlement processing, and

wherein said communication network is the Internet,

said user information processor is a user terminal,

10 said mediator information processor is a sales center terminal,

said authentication information processor is a banking terminal,

said portable recording medium is a cash card, and

15 said authentication number is a personal identification number.

15. A user authentication method comprising the steps of;

(a) providing a user authentication device having an authentication information processor to which a user information processor is connectable over a communication network,

5 (b) receiving a first authentication number from said user information processor;

(c) making a check using a database in response to the first authentication number from said user information processor;

(d) sending an access permission notification to said
10 user information processor if a user is authenticated as valid as a result of the check; and

(e) converting the first authentication number to a

second authentication number using the same conversion rule after sending the access permission notification and recording the
15 second authentication number into the database as a new first authentication number, and

(f) letting said user information processor to convert the first authentication number to a second authentication number using a predetermined conversion rule in response to an access
20 permission notification from said authentication information processor, and to use the second authentication number as a new first authentication number.

16. The user authentication method as defined by claim 15,

wherein said device causes said user information processor to perform:

reading a first authentication number and a predetermined
5 conversion rule from a portable recording medium and sending the first authentication number to said device;

converting the first authentication number to a second authentication number using the conversion rule in response to the access permission notification; and

10 recording the second authentication number on said portable recording medium as a new first authentication number.

17. The user authentication method as defined by claim 15,

wherein said device causes said user information processor to perform:

reading a first authentication number from a portable
5 recording medium and sending the first authentication number to

said authentication information processor, and

wherein said device causes said portable recording medium to perform:

converting the first authentication number to a second

10 authentication number using a predetermined conversion rule in response to the access permission notification and

recording the second authentication number on said portable recording medium as a new first authentication number.

18. The user authentication method as defined by claim 15,

wherein said device causes said user information processor to perform:

receiving a first authentication number and sending the

5 first authentication number to said authentication information processor; and

reading a predetermined conversion rule from said portable recording medium, converting the first authentication number to a second authentication number using the conversion rule 10 in response to the access permission notification, and outputting the second authentication number as a new first authentication number.

19. A user authentication method comprising the steps of:

(a) providing a user authentication device having an authentication information processor to which a user information processor and a mediator information processor are connectable 5 over a communication network,

(b) causing said user information processor to send a

first authentication number to said mediator information processor;

10 (c) causing said mediator information processor to send the first authentication number received from said user information processor to said authentication information processor;

15 (d) making a check by said authentication information processor using a database in response to the first authentication number from said mediator information processor and sending the second authentication number to said mediator information processor if a user is authenticated as valid as a result of the check, the second authentication number being different from the first authentication number;

20 (e) converting the second authentication number by said authentication information processor to a third authentication number using the same conversion rule and recording the third authentication number into the database as a new first authentication number;

25 (f) causing said mediator information processor to receive the second authentication number from said authentication information processor and to send the second authentication number to said user information processor, and

30 (g) causing said user information processor to convert a second authentication number to a third authentication number using a predetermined conversion rule in response to the second authentication number from said mediator information processor

and to use the third authentication number as a new first authentication number.

20. The user authentication method as defined by claim 19, wherein said user information processor is caused to perform:

reading a first authentication number and a predetermined

5 conversion rule from a portable recording medium and sending the first authentication number to said mediator information processor; and

converting the second authentication number to a third authentication number using the conversion rule in response to the 10 second authentication number, and

recording the second authentication number on said portable recording medium as a new first authentication number.

21. The user authentication method as defined by claim 19,

wherein said user information processor is caused to perform:

reading a first authentication number from a portable

5 recording medium and sending the first authentication number to said mediator information processor, and

wherein said portable recording medium is caused to convert the second authentication number to a third authentication number using a predetermined conversion rule in response to the 10 second authentication number, and to record the third authentication number on said portable recording medium as a new first authentication number.

22. The user authentication method as defined by claim 19,
wherein said user information processor is caused to
perform:

receiving a first authentication number and sending the
5 first authentication number to said mediator information
processor; and

reading a predetermined conversion rule from a portable
recording medium, converting the second authentication number to
a third authentication number using the conversion rule in
10 response to the second authentication number, and outputting the
third authentication number as a new first authentication number.

23. A transaction method using the user authentication method
as defined by claim 16,

wherein said user information processor is caused to send
the first authentication number and an accounts-settlement
5 request to said authentication information processor,

wherein said authentication information processor
executes the check and account-settlement processing, and

wherein said communication network is the Internet,

10 said user information processor is a terminal in a retail
store,

said authentication information processor is a credit
card company terminal,

said portable recording medium is a credit card, and

said authentication number is a credit card number.

24. A transaction method using the user authentication method

as defined by claim 17,

wherein said user information processor is caused to send
the first authentication number and an accounts-settlement
5 request to said authentication information processor,

wherein said authentication information processor
executes the check and account-settlement processing, and

wherein said communication network is the Internet,

said user information processor is a terminal in a retail
10 store,

said authentication information processor is a credit
card company terminal,

said portable recording medium is a credit card, and

said authentication number is a credit card number.

25. A transaction method using the user authentication method
as defined by claim 18,

wherein said user information processor is caused to send
the first authentication number and an accounts-settlement
5 request to said authentication information processor,

wherein said authentication information processor
executes the check and account-settlement processing, and

wherein said communication network is the Internet,

said user information processor is a terminal in a retail
10 store,

said authentication information processor is a credit
card company terminal,

said portable recording medium is a cash card, and

15 said authentication number is a personal identification
number.

26. A transaction method using the user authentication method
as defined by claim 20,

 wherein said mediator information processor is caused to
send the first authentication number and an accounts-settlement
5 request to said authentication information processor,

 wherein said authentication information processor
executes the check and account-settlement processing, and

 wherein said communication network is the Internet,

 said user information processor is a user terminal,

10 said mediator information processor is a sales center
terminal,

 said authentication information processor is a credit
card company terminal,

 said portable recording medium is a credit card, and

15 said authentication number is a credit card number.

27. A transaction method using the user authentication method
as defined by claim 21,

 wherein said mediator information processor is caused to
send the first authentication number and an accounts-settlement

5 request to said authentication information processor,

 wherein said authentication information processor
executes the check and account-settlement processing, and

 wherein said communication network is the Internet,

 said user information processor is a user terminal,

10 said mediator information processor is a sales center terminal,

 said authentication information processor is a credit card company terminal,

 said portable recording medium is a credit card, and

15 said authentication number is a credit card number.

28. A transaction method using the user authentication device as defined by claim 22,

 wherein said mediator information processor is caused to send the first authentication number and an accounts-settlement request to said authentication information processor,

 wherein said authentication information processor executes the check and account-settlement processing, and

 wherein said communication network is the Internet,

 said user information processor is a user terminal,

10 said mediator information processor is a sales center terminal,

 said authentication information processor is a banking terminal,

 said portable recording medium is a cash card, and

15 said authentication number is a personal identification number.